Attorney: Art Hasan

Docket No.: 42055/SAH/K415

Inventor(s): Philip J. Kellman, Ph.D.

Title: SYSTEM AND METHOD FOR
ADAPTIVE LEARNING
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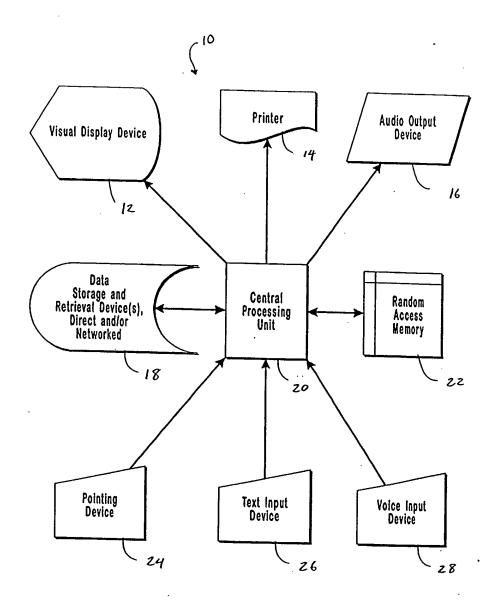


FIG. 1



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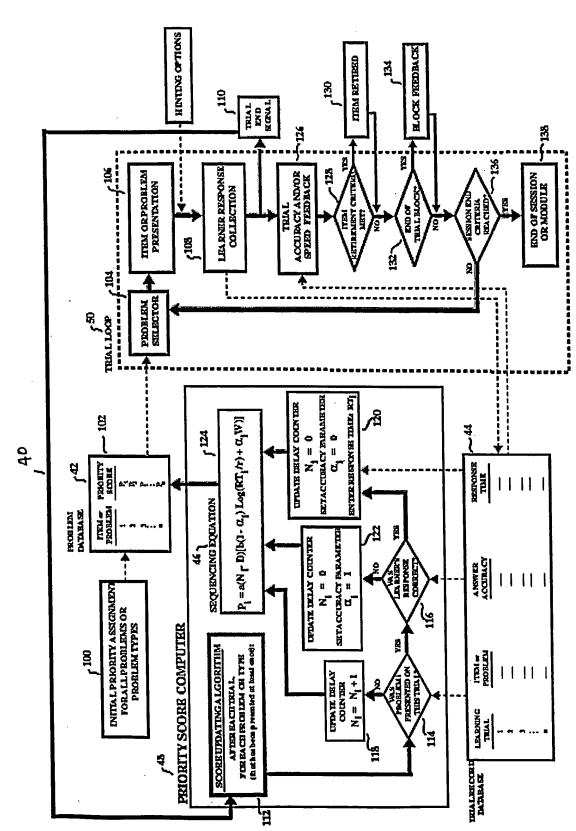


FIGURE 2. OPTIMIAL SEQUENCING METHOD

RESPONSE

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ACCURACY TIME (sec) COMMENT	COMMENT	Past. correct menomen	Inductor: response	Cornect but sinw		Recurrence of numblem missed on Halist	Probabilities of Italy.	Recurrence of amblem missed on 7-4-1.4	'A light on the same with the same of the		Recurrence of numbles ensured straits at making	From the market some of 11313.	Recurrence of problem missed on Trial 9.		Recurrence of ambian answord shouly on nation	Recurrence of amplian missed on True to	ACTITIONS Of Problem comments and the comments of the comments	Recurrence of problem answered quickly on Trial 1. Recurrence of problem answered slowly on Trial 7. Recurrence of problem missed on Trial 14.			
Ş		CORRECT 3.5	WRONG	CORRECT 18,4	WRONG	T 11.7		CORRECT 10.4		WRONG	CORRECT 6.1	CORRECT 4.8	WRONG I	CORRECT 2.4	WRONG R	CORRECT 4.5 B				32	CORRECT 3.9 Recurrence of Trial 10 problem.
PROBLEM BESPONSE		'₩' =7X7	6X7= - 1'38"	7X4= "28"	12 X 7= 12 X 72"	6 X 7 = - "42"	9 X 9 = 72"	12 X 7 = ''84"	5 X 8= "40"	9X9= 1.80"	1 7 X 4= "28"	6X3= "18"	9X9= \"74"	3X4= "12"	6X7= - '32"	9X9= 181	1X7 = 1'49"	12 X 7 = "84"	6X7= - "42"	3 X 10= "30"	7X4= "28"
TRIAL		-	14	m	4	S	9	~	so.	0,	9	=	21	ដ	*	S	16 L	17	18	19	8

Figure 3. Sample Sequence of This Using the Sequencing Algorithm. Relevant parameter values: a=.1, b=2, D=2, W=12, K=1.

Arrows indicate selected examples of problem recurrence. See taxt.)

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Figure 4. Priority Scores by Trial for Sample Seguence in Figure 3. Columns indicate trials, rows show a partial list of problems in the database. Circled priority scores indicate the problem chosen by the algorithm for that trial Parameter values: a = .1; b=2; W=12; D=2; k=1; r=2.

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TRIAL	PROBLEM	RESPONSE	ACCURACY	TIME (see	n) CCAARAERT
		Masi Ores	ACCORACI	THATE (SE	c) COMMENT
1	camino	"road"	CORRECT	3.5	Fast, correct response.
2	Martes	"March"	WRONG	••	Incorrect response.
3	dos	"two"	CORRECT	18.4	Correct but slow.
4	verde	"Don't know"	WRONG	••	
5	anaranjado	''angel''	WRONG		
6	Martes	"Tuesday"	CORRECT	15.0	Recurrence of problem missed o
7	Abril	"April"	CORRECT	10.4	, , , , , , , , , , , , , , , , , , ,
8	facil	''easy''	CORRECT	2.6	
9	verđe	"green"	CORRECT	9.7	Recurrence of problem missed o
10	anaranjado	'apple''	WRONG		Recurrence of problem missed o
11	Viernes	"Frklay"	CORRECT	4.8	
12	azül	"blue"	WRONG		
13	das	"two"	CORRECT	2.4	Recurrence of problem answered
14	Noviembre	"November"	CORRECT	8.6	
15	anaranjado	"orange"	CORRECT	11.3	Recurrence of problem missed o
16	cero	'zero''	CORRECT	2.7	
17	camino	"road"	CORRECT	6.2	Recurrence of problem answered
18	Martes	"Tuesday"	CORRECT	5.1	Recurrence of problem answered
19	hija	"daughter"	CORRECT	3.2	Landin min urse
20	empujar	"orange"	WRONG		

Figure 5. Sample Sequence of Trials Using the Sequencing Algorithm with Parameters Set to Favor Introduction of Relevant parameter values: a=.1, b=1.5, D=2, r=2, W=6, K=1.2.

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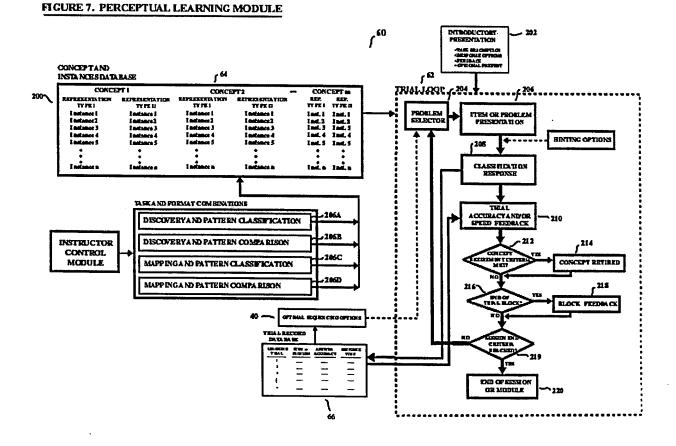
									11	uar										
ROBLEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
camino	\square	09	0	.09	.18	.27	.37	.46	.55	.64	.73	.82	.92	1.01	1.1	1.19	(B)	09	0	.09
Martes	1.2	(E)	-0.6	0	0.6	(3)	-0.14	0	.14	.28	.42	.56	.70	.84	.98	1.11	1.25	3	~08	0
dos	1.2	1.2	\odot	0.16	0	.16	.32	.49	.65	.81	.97	1.13	(~12	0	.12	.25	.37	.49	.61
verde	1.2	1.2	1.2	12	-0.6	0	.6	1.2	(E)	0.12	0	-0.12	.23	.345	.46	.58	.69	.81	.92	1.04
anaranjado	1.2	1.2	1.2	1.2	(3)	-0.6	0	.6	1.2	(E)	-0.6	0	.6	1.2	(E)	12	0	.12	.25	.37
Abril	1.2	1.2	1.2	1.2	1.2	1.2	<u>(1</u>	08	0	.08	.17	.25	.34	.42	.51	.59	.68	.76	.85	.93
facil	1.2	1.2	1.2	L2	1.2	1.2	1.2	<u> </u>	09	0	.09	.18	.27	.37	.46	.55	.64	.73	.82	.92
Viernes	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(1)	-0.16	0	.16	.33	.49	.66	.82	.99	1.15
azul	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(1)	07	0	.07	.13	.20	.26	.33	.40
Noviembre	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(13)	-0.11	0	.11	.22	.33	.44
cero	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	13	~09	0	.09	.19
bija	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	12	-0.6
empujar	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	12
amariilo	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	T
Lunes	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
обсгот	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

FIGURE 6. Priority Scores by Trial for Sample Sequence in Figure 5. Columns indicate trials; rows show a partial list of problems in the database. Circled priority scores indicate the problem chosen by the algorithm for that trial. Parameter values: $\alpha = .1$; b=1.5; W=6; D=2; k=1.2; r=2.

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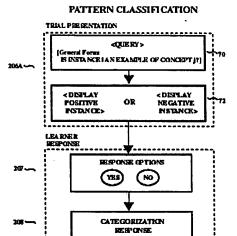
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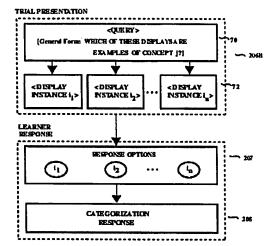
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FIGURE 8. PERCEPTUAL LEARNING SYSTEM: STRUCTURE DISCOVERY VARIANT

PROBLEM PRESENTATION FORMATS - DETAIL



PATTERN COMPARISON

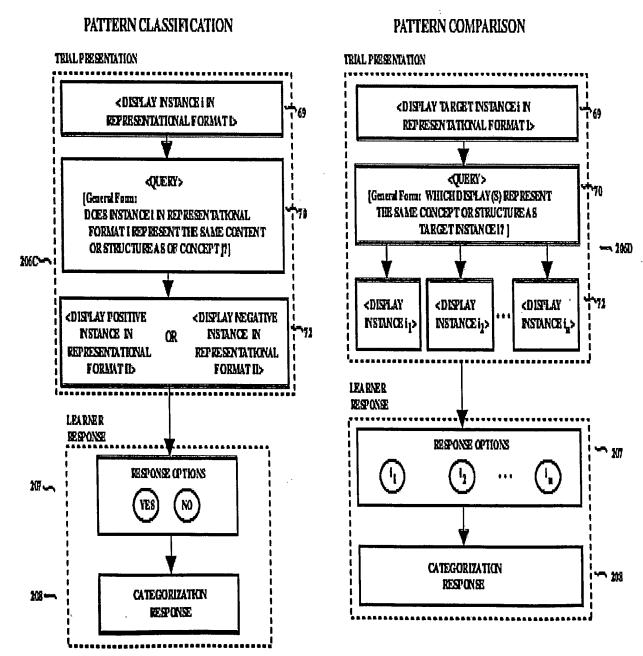


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FIGURE 9. PERCEPTUAL LEARNING SYSTEM: STRUCTURE MAPPING VARIANT

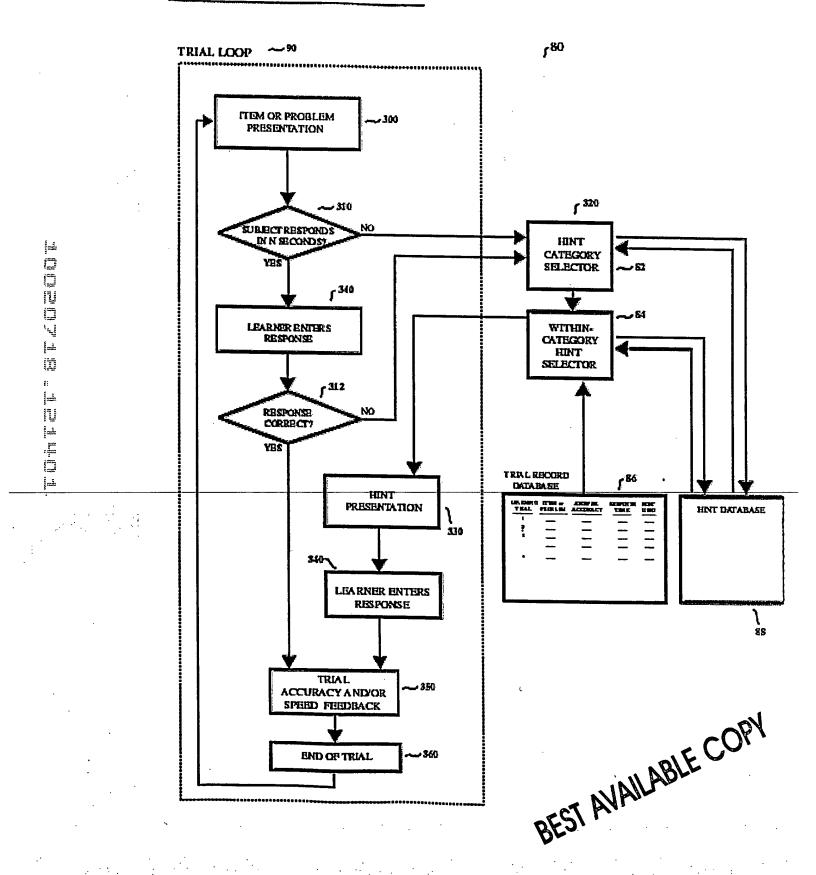
PROBLEM PRESENTATION FORMATS - DETAIL



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FIGURE 10

HINTING ALGORITHM: OVERVIEW



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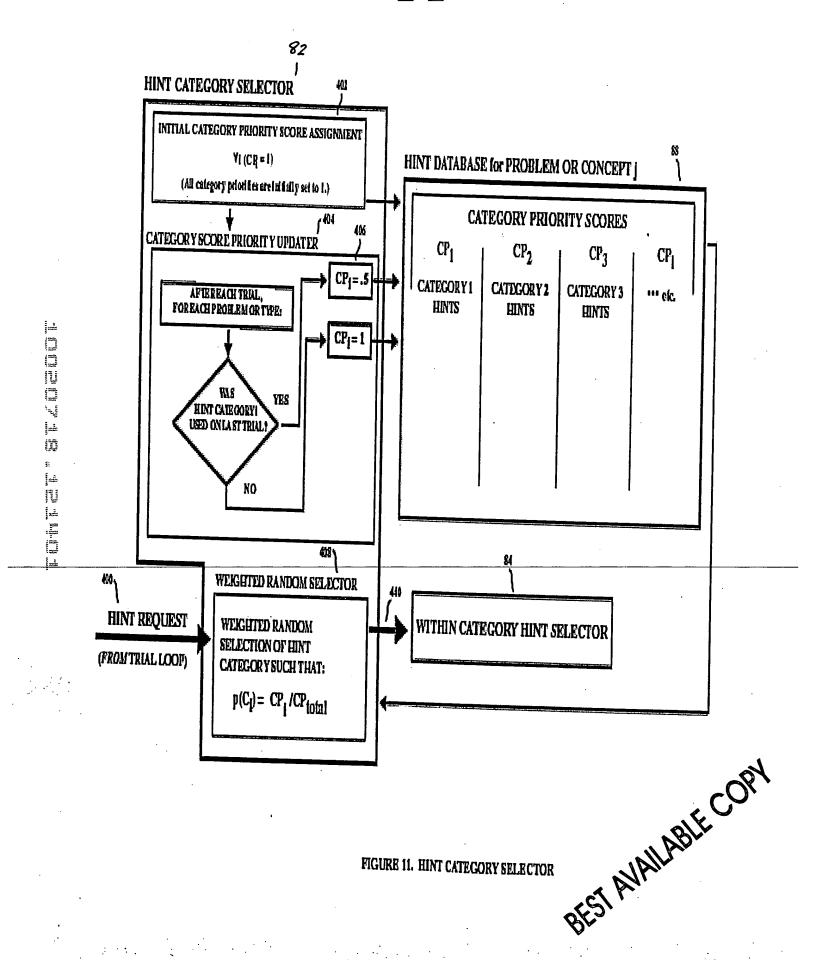


FIGURE 11. HINT CATEGORY SELECTOR

WITHIN CATEGORY HINT SELECTOR HINT PRIORITY SCORE COMPUTER INTTIAL PRIORITY ASSIGNMENT ھ) ہے $Y_{\parallel}(\mathrm{HP}_{\parallel}=1)$ (All bints given it if al priority score of 1.) HINT PRIORITY SCORE COMMUTER AFTERBACH TRIAL for each problem or type: FOR BACHHINT CATEGORY HINT DATABASE for PROBLEM OR CONCEPT J KONTINUEA CATEGORY 1 CATEGORY 1 THIS CATEGORY USED EXIT ON THIS TRILLY (No score druges) HINTS HINTS etc. YES PRIORITY PRIORITY HINT SCORE HINT SCORE HINTI USED HINT I HP₁ HINTI HFI ONLAST TRIAL THAT TRIAL RECORD HP₂ HINT 2 TAIHEIHI CEEU HINT 2 HP₂ CATEGORY DATABASE HINT 3 HP3 HINT 3 HP₃ NO (supplies performance 1 data ol, RII) HINTI ΗĄ HINT Нη 'HINT REQUEST SPECIFIC HINTSELECTOR (FROM HINT CATEGORY HINT OUTPUT SELECTOR) (TO DISPLAY)

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FIGURE 12 WITHIN-CATEGORY HINT SELECTOR

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